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Cross-timescale interference and predictability of extremes: a chimera?

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Cross-timescale interference involves linear and non-linear interactions between climate modes acting at multiple timescales (Muñoz et al., 2015, 2016, 2017; Robertson et al., 2015; Moron et al., 2015), and that are related to windows of opportunity for enhanced predictive skill (Mariotti et al., 2020), with relevant societal impacts (e.g., Doss-Gollin et al., 2018; Anderson et al., 2020). Using a simple mathematical model, reanalysis data and gridded observations, here we analyze plausible mechanisms for cross-timescale interference, describing conditions for coupling of oscillating modes and its impact on extreme rainfall occurrence and predictive skill. Concrete examples for Northeast North America and southern South America are discussed, as well as implications for climate model diagnostics.